MODULUS

Servo Controlled Subwoofer
Electronic Control Unit

SERVICE MANUAL

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NOTICE

THE FOLLOWING PARTS ARE NO LONGER AVAILABLE FROM INFINITY SYSTEMS:

COMPLETE SUBWOOFERS
COMPLETE AMP ASSEMBLIES
COMPLETE ELECTRONIC CONTROL UNITS (ECU)
SUBWOOFER POWER TRANSFORMERS

MODULUS SUBWOOFER SPECIFICATIONS

Frequency Response:	22 - 200 Hz
Crossover Frequency:	
High Pass:	22Hz and 35 Hz, 12 dB per octave
Low Pass:	50 - 200 Hz (Continuously Variable, 12dB per octave)
Output Power:	250 Watts (RMS)
Driver:	12" IMG Woofer w/ accelerometer - (2 Ohm DCR)
Inputs (to ECU):	Line Level (from Electronic Control Unit)
Outputs (from ECU):	6 dB per octave passive filter for satellite amplifier
Servo Control System	Motional feedback, accelerometer controlled
Dimensions:	19 17 ½ X 17 12" (H x W x D) (483 x 444 x 444mm)

MODULUS ECU SPECIFICATIONS

CONTROL PARAMETERS:

Crossover: Full CW
Phase: 0 degrees
Level: Full CW
Switch: 22 Hz

BOTH CHANNELS DRIVEN UNLESS OTHERWISE SPECIFIED

Max Vin:	5.0 volts	(One channel)
	8.0 volts	(Both channels)

Note: Higher input voltages can be achieved with lower "level" control (knob) levels

Max Vout:	5.0 volts	(One channel driven)
	8.0 volts	(Both channels driven)

Gain @ 70 Hz: 0 dB (none)

Input Sens.: 500µV — 8.0 volts

Zinput: 70KΩ

Zoutput: 260Ω

S/N Ratio: —124 dB

THD+N
20 Hz — 200 Hz: less than .002%
200 — 800 Hz: less than .01%

We at Infinity Systems, Inc. would like to take this opportunity to thank you for choosing the Modulus Subwoofer and commend you on your choice. The Modulus Subwoofer is a fully self-contained, 250 watt, servo-controlled subwoofer system able to achieve levels of performance that are unrivaled by similar systems. **In order to bring out the best from your Modulus Subwoofer, it is important that you read through this manual before connecting and operating your subwoofer.**

If any of the instructions in this manual are not clear or if you have any additional questions about installing or using your Modulus Subwoofer, you should contact your dealer or Infinity Systems for clarification.

UNPACKING THE SUBWOOFER

As you have undoubtedly noted, the subwoofer is extremely heavy, so please use caution when unpacking and handling it. Help from a second person is recommended when removing the subwoofer from its shipping carton.

The subwoofer cabinet is finished in a baked polyester resin that is durable and resistant to scratching and marring. However, the finish can be damaged if improperly handled. Care of the subwoofer cabinet is contained in a special section later in this manual.

If the subwoofer, or any of its associated parts was damaged in transit, contact your dealer, or carrier immediately.

The contents of the subwoofer carton should be checked to ensure that the following items are included:

1. Subwoofer
2. Electronic Control Unit (ECU)
3. Four (4) black metal isolation feet
4. Four (4) black plastic isolation feet covers
5. One (1) packet of silicone adhesive
6. One (1) 25 foot cable with DIN connectors at each end.

The subwoofer packing materials should be saved in case the subwoofer needs to be repackaged for reshipment at a later date.

As a minimum, save the packaging materials until you are sure your subwoofer is not damaged and is operating properly.

THE SUBWOOFER

The subwoofer includes the speaker, the power amplifier, and the input panel. The power amplifier is the black aluminum structure located on the right-front corner of the enclosure. The input panel is located on the bottom of the enclosure and the speaker is located behind the enclosure grille. Also located behind the grille, in the lower-right corner, is a red LED to indicate when the subwoofer input panel POWER switch is set to ON. This red LED indicates that the subwoofer is in the standby mode and ready to play.

Subwoofer Input Panel

The subwoofer input panel (figure 1), located on the bottom of the subwoofer, contains the controls and connectors required to make your subwoofer work with your system.

INPUT connector – is a DIN connector that is used to connect the subwoofer to the ECU.

POWER switch – turns the A.C. power on and off.

A.C. VOLTAGE SELECTOR – sets the subwoofer's power supply to conform with the A.C. line voltage at the user's location. The subwoofer is normally shipped with this switch set to 110 volts.

A.C. Line Cord – connects the A.C. power from the wall outlet to the subwoofer.

Power ON LED – lights when the **POWER** is set to **ON**.

ELECTRONIC CONTROL UNIT

The Electronic Control Unit (ECU) is an electronic device that is connected between your system preamplifier and the subwoofer. The ECU controls the subwoofer allowing the owner to make adjustments for optimum output regardless of the placement of the subwoofer.

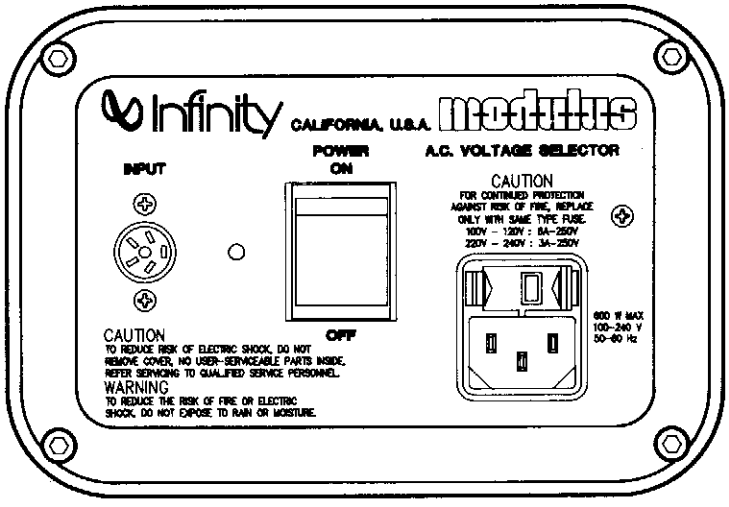


Figure 1. Subwoofer Input Panel

ECU Front Panel

The ECU front panel (figure 2) contains the controls and switches for crossover, phase, level and power to your subwoofer.

CROSSOVER control – sets the upper limit of the subwoofer frequency response. The upper limit is where the subwoofer begins to roll off to meet the low frequency output of your satellite speakers.

PHASE control – used to optimize the blend of the subwoofer with the satellites when the subwoofer cannot be placed in the best room location due to room layout or space. The phase control is variable from 0 to 180°. The control is normally set fully counterclockwise (0), but can be set anywhere within its rotation.

LEVEL control – sets the subwoofer volume.

LOW CUT selector – rolls off the response of the subwoofer at either **22Hz**, or **35Hz**. The normal setting is **35Hz**. However, if a particular recording does not have rumble, or if the volume of the overall music being played is not excessively loud, then **22Hz** can be used.

POWER switch – turns the A.C. power to the ECU on and off and activates the subwoofer.

Power ON LED – lights when power is applied to the ECU.

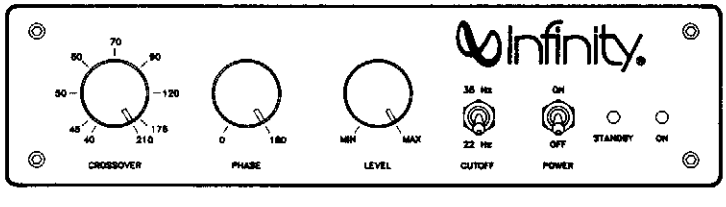


Figure 2. ECU Front Panel

ECU Input/Output Panel

The ECU input/output panel (figure 3) contains the switches and jacks that allows you to connect the ECU to your system and set up the voltage and high pass circuits.

HIGH PASS FREQUENCY DIP switches – used to select the ECU internal capacitor value to match the satellite amplifier input impedance. The capacitor value selected will create a 140Hz cutoff frequency at 6dB/octave. A complete discussion of the high pass circuit is contained in the **ECU Initial Settings** section of this manual.

OUTPUT connector – supplies subwoofer A.C. control voltage and the low frequency signal to the subwoofer power amplifier.

INPUT jacks (parallel pair) – one pair is used to connect the preamp output to the ECU. If you want to bypass the ECU's internal highpass crossover, the second pair can be used to connect the preamp output directly to the satellite speaker's amplifier.

HIGH PASS OUTPUT jacks (parallel pair) – one pair is used to connect the high pass output to the satellite speaker's amplifier. The second pair can be used to connect an RCA-type shunt resistor when required. This is discussed later in this manual.

A.C. VOLTAGE SELECTOR – sets the ECU's power supply to conform with the A.C. line voltage at the user's location. The ECU is normally shipped with this switch set to 110 volts.

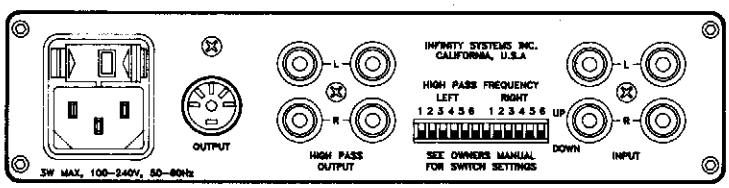


Figure 3. ECU Input/Output Panel

MAKING YOUR SUBWOOFER READY FOR USE

Installing the Isolation Feet

The four (4) black-metal isolation feet must be installed on the bottom panel of the enclosure. To install the isolation feet:

1. Place the subwoofer on a soft, clean, scratch-free surface with the bottom facing up.
2. Remove the plugs (figure 4) in each of the isolation feet mounting holes.
3. Screw one isolation foot in each of the pre-threaded holes. **Make sure that the isolation feet are tight.**

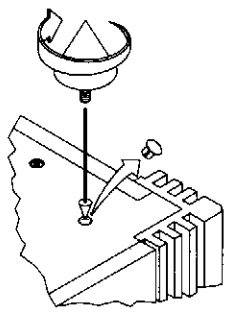


Figure 4. Isolation Feet Installation

Installing The Isolation Feet Covers

If the subwoofer is going to be placed on a hardwood or tile surface, we recommend that you install the plastic covers over the isolation feet. The covers will prevent the feet from scratching the floor surface.

The covers should be glued in place with a small dab of the supplied silicone adhesive.

Input Voltage Settings

CAUTION: Before making any connections between the subwoofer, ECU, and your audio system components, be sure that the power switches are off and the A.C. plugs are removed from the wall outlet.

The ECU and subwoofer are designed to operate from a variety of input voltage levels and frequencies. When the voltage is changed, the current rating of the input fuse may also change.

The ECU contains an internal fuse that offers protection at all of the voltage settings.

The subwoofer input fuse must be changed per the following list as the input voltage level is changed.

The voltages are set using the **A.C. VOLTAGE SELECTOR** on the ECU input/output panel and the **A.C. VOLTAGE SELECTOR** on the subwoofer input panel.

The following is a list of the available voltage settings and applicable fuse size (current rating) for each.

Voltage/Frequency	Fuse Size
120V/60Hz (US)	6 amp slow-blow
100V 50/60Hz	6 amp slow-blow
220V/50Hz	3 amp slow-blow
240V/50 Hz	3 amp slow-blow

Changing the ECU Input Voltage Setting

The ECU input voltage is selected by sliding the **A.C. VOLTAGE SELECTOR** switch to the desired voltage setting.

ECU Initial Setting

Be sure to make the ECU Initial Settings before making any connections to the ECU.

CROSSOVER – 100Hz
PHASE – Full counterclockwise
LEVEL – 12 o'clock (50%)
LOW CUT – 35Hz
HIGH PASS FREQUENCY – see below

The ECU contains a passive 6dB/octave high pass filter which rolls off low frequency energy to the satellites at 140Hz. This is required so the satellites do not overload due to excessive low frequency energy which could cause bottoming of the drivers and excessive distortion.

Since amplifiers have varying input impedances (ranging from 5K ohms (rare) to 100K ohms, or higher) it becomes necessary to select the correct value of capacitance in order to achieve the desired corner (crossover) point of 140Hz. The amplifier's input impedance plus the amount of capacitance in the circuit determines the actual crossover point. You may determine the input impedance of your satellite speaker power amplifier by referring to your owner's manual, or contacting the amplifier manufacturer.

As the impedance drops, the required capacitance has to increase in order to maintain the recommended 140Hz crossover frequency. If the various "dip switches" on the ECU are not properly set (for example, if too much capacitance is added), the satellites could receive too much low frequency energy because the crossover frequency will move down, and this can result in satellite woofer bottoming, distortion, the inability of the satellites to play loudly, or even excessive heaviness in the mid-bass because the satellites in combination with the subwoofer are producing more low frequency energy than what is ideal.

Too little capacitance will move the crossover point to a higher than optimum frequency causing the sound to become thin and lacking in middle bass timbre.

The chart is a recommended starting point. If you feel that you have the capacity to identify nuances in sonic balance, you can trim the crossover frequency by adding, or deleting capacitance (by changing switches) until the sonic balance blends uniformly with the subwoofer, your room and personal preference.

NOTE: The switches are closed in the **down** position. See figure 5 for a schematic of the switch operation.

Input Impedance Range in Ohms	Switch 6	Switch 5	Switch 4	Switch 3	Switch 2	Switch 1	Shunt Resistor*
8-12K	DOWN	DOWN	UP	DOWN	DOWN	DOWN	-
12-18K	UP	UP	DOWN	DOWN	DOWN	DOWN	-
16-24K	UP	UP	DOWN	UP	DOWN	DOWN	-
26-40K	UP	UP	DOWN	UP	UP	DOWN	-
40-60K	UP	UP	UP	UP	UP	DOWN	-
70-80K	UP	UP	UP	UP	UP	DOWN	200K
80-120K	UP	UP	DOWN	UP	UP	UP	-
120-200K	UP	UP	UP	UP	UP	DOWN	68K
200-500K	UP	UP	UP	UP	UP	DOWN	56K
500K-1 Meg	UP	UP	UP	UP	UP	DOWN	51K

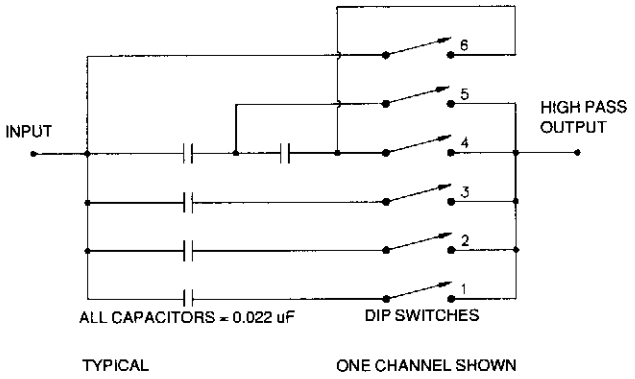


Figure 5. High Pass Filter Schematic Diagram

*NOTE: When plugged into the second pair of high pass outputs, the shunt resistor is in parallel with the input of the satellite amplifier. This lowers the effective impedance, allowing the use of the built-in capacitors in the ECU. If the amplifier you are using for your satellites requires the use of shunt resistors, as shown by the table above, call or write Infinity's Customer Service Department for assistance.

The 140Hz crossover frequency is not critical, and is given as a starting point. If, for example, your satellite speaker power amplifier has an input impedance of 200K, which requires a 68K shunt resistor to achieve the 140Hz crossover frequency, you could set the DIP switches for a 120K input impedance, and play the system without the 68K shunt resistor. This will result in a lower than 140Hz crossover frequency. If your satellite speakers show signs of distress (distortion) in the lower frequencies, exercise caution on how loudly you play the system until you can install the correct shunt resistor.

Changing the Subwoofer Input Voltage Setting and Fuse

1. In the center of the **A.C. VOLTAGE SELECTOR**, loosen the fuse holder with a 1/4 turn counterclockwise.

2. Using a pair of needle-nose pliers, insert the tips in the indentations, near the 110 and 200 marks, and slowly turn the switch to the desired setting.

3. Remove the fuse and verify the size. **NEVER INSTALL A FUSE WITH A HIGHER THAN RECOMMENDED RATING.**

4. Install the fuse by pushing in and turning clockwise until it locks in place.

Connecting the Subwoofer and ECU

CAUTION: Make sure that the voltage settings are the same for the ECU and Subwoofer.

1. On your audio system, locate the cable connected between the PREAMPLIFIER OUTPUT and AMPLIFIER INPUT.

2. Unplug the cable from the AMPLIFIER INPUT.

3. Refer to figure 6 and connect the PREAMPLIFIER OUTPUT to one of the ECU **INPUT** pairs.

4. Connect a cable between one of the ECU **HIGH PASS OUTPUT** pairs and your satellite speaker amplifier's INPUT.

5. Connect the supplied 25 foot cable between the ECU **OUTPUT** connector and the subwoofer input panel **INPUT** connector.

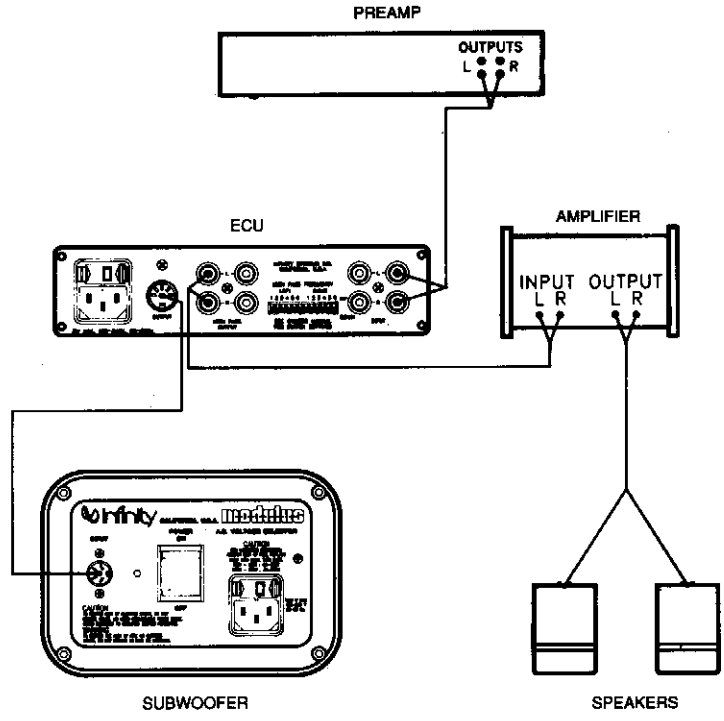


Figure 6. System Interconnecting Diagram

Positioning the Subwoofer

The performance of the subwoofer with your satellite speakers is directly related to where it is placed in the listening room and how it is positioned with respect to the satellite speakers. The final position will be the result of patience and experimentation on your part. Testing for sonic balance and blending should always be done from your normal listening position using a wide range of source material.

Starting Position

Begin your position experimentation by placing the subwoofer closer to the right satellite speaker with the rear of the subwoofer approximately six or seven inches from the rear wall, as shown in figure 7.

The initial position may turn out to be the most satisfactory. However, it is recommended that other locations be tried to obtain a smooth transition between the bass frequencies and the rest of the musical range. Figure 8 shows how bass response is affected by the subwoofer's position with respect to the wall(s). If the bass response is lean, try locating the subwoofer closer to a wall. If the bass is too heavy, the subwoofer should be moved away from the wall and placed near the center of the two satellite speakers. It is acceptable to place the subwoofer anywhere it looks and sounds best.

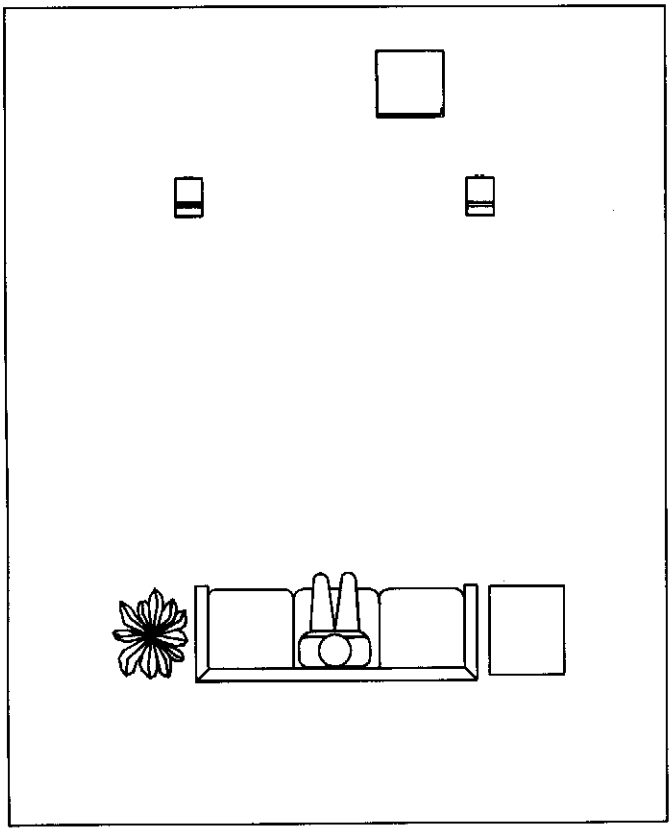


Figure 7. Typical Starting Position Layout

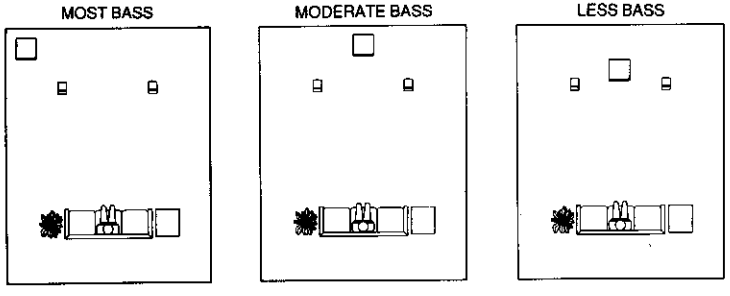


Figure 8. Bass Response With Relation To Wall(s)

OPERATING THE SUBWOOFER

Power Up

1. Plug all components into an A.C. outlet.
2. On the subwoofer input panel, set the **POWER** switch to **ON**. The power LED on the input panel will display a **RED** light. The red LED behind the grille indicates that the subwoofer is on standby.
3. Turn on the power to the audio components.
4. Set the ECU **POWER** switch to **ON**. The ECU activates the subwoofer and turns off the red LED behind the grille.

Listening to Your System

1. Turn the VOLUME control on your preamplifier to a comfortable listening level and begin playing a record, CD, or cassette that is rich in bass information.
2. Experiment with the controls on the ECU until you are pleased with the sound. The bass should enhance but not overpower the rest of the music.
3. Experiment with the placement of the subwoofer. Minor position adjustments may produce results that are even more pleasing.

The 0 to 180° phase control located on the front panel of the ECU should be rotated to optimize the blend of the subwoofer and satellites. There will be a position within the full rotation of this control which will yield the best results. As you rotate the control listen for the following:

1. Maximum bass output
2. Greater low frequency definition
3. A seamless transition between the subwoofer and the satellites.

You may experience all three sonic characteristics or only one or two. The phase control may be set anywhere within its rotation for optimum performance.

Impact of Tone Control on Your System

The tone controls on your audio components should be used with the utmost discretion. Excessive boost can demand hundreds of watts in the bass region. In the flat position or with the tone controls switched out of your system, as little as 10 watts can produce impressive and realistic listening levels. The remaining power amplifier capacity is in reserve for power peaks on sharp transients and powerful crescendos. With the flexibility of the ECU, you should be able to leave the bass control of your preamp at the flat position.

CARE OF THE ENCLOSURE

The enclosure of your subwoofer is finished with a durable, high-gloss, scratch-resistant polyester resin. The finish should be kept clean by occasionally dusting with a lint-free cotton cloth. Fingerprints and other minor blemishes may be removed with a lint-free cloth dampened with ammonia-free window cleaner. **Do not use abrasive or chemical cleaners.**

The grille may be cleaned by gently vacuuming with a furniture brush attachment.

IN CASE OF TROUBLE

If the subwoofer sounds distorted, stops playing, or otherwise seems to be malfunctioning, first determine if the problem is in the subwoofer, wiring, or other audio components. If the problem also affects the satellite speakers, the cause is most likely in your electronics. If it is only noticed in the subwoofer, make sure that all connecting cables are correct and in proper working condition. Make sure the subwoofer and ECU are plugged in and turned on. Check the subwoofer A.C. fuse. If everything seems to be in good working order and the subwoofer still malfunctions, **DO NOT ATTEMPT ANY REPAIRS!** Contact your dealer for the nearest authorized Infinity Service Center.

If you do not have a service center near you, contact:

Infinity's Customer Service
(818) 407-0228

or write:

Infinity Customer Service
9409 Owensmouth Avenue
Chatsworth, CA, 91311 (USA).

DO NOT SHIP YOUR SUBWOOFER OR ECU FOR SERVICE WITHOUT PRIOR AUTHORIZATION.

DESCRIPTION OF MODULUS ECU (**E**lectronic **C**ontrol **U**nit)

This description of the role of the Modulus ECU is a somewhat more detailed description that is included with the Owner's manual

I DESCRIPTION

The Modulus ECU is an active electronic crossover intended to be connected between your system preamplifier and your subwoofer & satellite loudspeakers. It contains variable controls for gain, phase and crossover frequency. (see graph #1 for typical effects of the crossover control)

The high-pass filter section of the ECU is a passive, capacitive 6dB/octave filter. The output is the RCA jacks marked "High-Pass Output" at the rear of the unit. ***If this filter is used alone without the need for the low-pass section to a powered subwoofer (special din cable), the power to the ECU may be turned off. Even the power cord to the unit may be removed.***

II HOOK-UP INSTRUCTIONS

Input jacks are used to connect your preamp output to the ECU. Even though there are two sets for the Right and Left channel input, either set of jacks may be used as they are in parallel. **If the unit is being used for only one channel of a "stereo" set-up, a Y-cable is recommended to split the signal and enter both right and left channel jacks.**

The supplied cable (Din to RCA) is then connected from the ECU to the input of your power amplifier or receiver.

The High Pass Output jacks are used to connect the high pass output to your satellite speaker's amplifier. These jacks are also in parallel.

III USE OF DIP SWITCHES

The **D**ual **I**n-line **P**ackage switches at the rear of the unit (moved up or down with a small tool or pencil point) will affect the high pass crossover frequency. Actually, two factors will affect the frequency - the input impedance of your satellite amplifier **and** the position of the DIP switches. Since you cannot **raise** the input impedance of your amplifier **it** is going to be the determining factor as to how much range (adjustment) you are going to have when choosing a high pass crossover point. The higher the impedance is, the more range you will have. (A typical input impedance is 47kΩ.)

Refer to the option guide below as a starting point. If followed, the resulting crossover point will be 140 Hz. For other crossover points, refer to these conclusions:

1. A **lower** amplifier input impedance will result in a **higher** crossover point at a given switch position.
2. As the switch positions progress, (options 1 - 10) they result in a **higher** crossover point.

OPTION #	INPUT IMPEDANCE RANGE (OHMS)	SWITCH 6	SWITCH 5	SWITCH 4	SWITCH 3	SWITCH 2	SWITCH 1	SHUNT RESISTOR *
1	8 -12K	DOWN	DOWN	UP	DOWN	DOWN	DOWN	-
2	12 -18K	UP	UP	DOWN	DOWN	DOWN	DOWN	-
3	16 - 24K	UP	UP	DOWN	UP	DOWN	DOWN	-
4	26 - 40K	UP	UP	DOWN	UP	UP	DOWN	-
5	40 - 60K	UP	UP	UP	UP	UP	DOWN	-
6	70 - 80K	UP	UP	UP	UP	UP	DOWN	200K
7	80 - 120K	UP	UP	DOWN	UP	UP	UP	-
8	120 - 200K	UP	UP	UP	UP	UP	DOWN	68K
9	200 - 500K	UP	UP	UP	UP	UP	DOWN	56K
10	500K - 1MEG	UP	UP	UP	UP	UP	DOWN	51K

* The "shunt resistor" mentioned in the latter options is a ¼ watt resistor soldered across an RCA male plug (2 required). These are plugged into the adjacent high pass output jacks you will be using (internally in parallel). The purpose is to present a lower input impedance to the ECU filter for more optional settings. If you are unable to assemble these or have no access to the correct parts call Infinity Systems.

EXAMPLE #1: We have an amplifier with an impedance of 20k, but we want a higher crossover point than 140 Hz.

SOLUTION: Try switch options 4 or 5.

EXAMPLE #2: We have an amplifier with an impedance of 75k, but we want a lower crossover point than 140 Hz.

SOLUTION: Try switch options 1,2,3, or 4.

IV KNOB RECOMMENDATIONS:

Again, if using the high pass filter **only** on the ECU: all knob positions are irrelevant (including power) as the filter section is a separate, passive section.

If you are using a powered subwoofer of some type other than the Infinity subwoofer designed for this system, we recommend using either one set of controls or the other; It would be redundant to manipulate both sets of controls. If you are going to use the controls on your subwoofer, set the "Crossover" and "Level" knob to the ECU on full CW (clockwise); set the "Phase" knob on "0" (full CCW); set the "22/35" Hz switch on 22 Hz. Then use the frequency and gain controls on your subwoofer **only**. If you are going to use the ECU controls only, set the "Crossover" knob on the subwoofer at full CW and start with the "Level" control at 12 O'clock (half-way). If more gain is needed (after turning the ECU gain up during testing) then the level pot can be turned up further. Then use the frequency and gain controls on your ECU **only**.

If you have a powered subwoofer of some other brand that does not have a gain or frequency control, use the controls on the ECU with discretion.

TROUBLESHOOTING THE MODULUS SUBWOOFER SYSTEM (IF999912 B/W)

I BLOWS LINE FUSE IN CABINET IMMEDIATELY
Usually: Short in toroidal transformer (power supply)
Could be: Short in amplifier
Could be: Voltage selector switch in wrong position

II BLOWS LINE FUSE IN CABINET AFTER SHORT PERIOD OF TIME, PLAYING MUSIC
Usually: Defective amplifier

III BLOWS LINE FUSE IN ECU
Usually: Defective ECU
Could be: Voltage selector switch in wrong position

IV BOTH LED's DO NOT LIGHT ON ECU
Usually: Defective ECU
Could be: Blown ECU line fuse or defective power cord
Could be: Lacking AC power source to line cord
Could be: Voltage selector switch in wrong position

V POWER LED (RED) O.K.; GREEN LED DOES NOT LIGHT ON ECU
Must be: Defective ECU

VI ALL LED's NORMAL, (cabinet LED goes off after delay) BUT NO OUTPUT
Usually: Defective amplifier
Could be: Defective ECU
Could be: Defective control cable

VII FRONT CABINET LED DOES NOT LIGHT (with ECU off or disconnected)
Usually: Defective amplifier
Could be: Defective toroidal transformer (power supply)
Could be: Blown line fuse

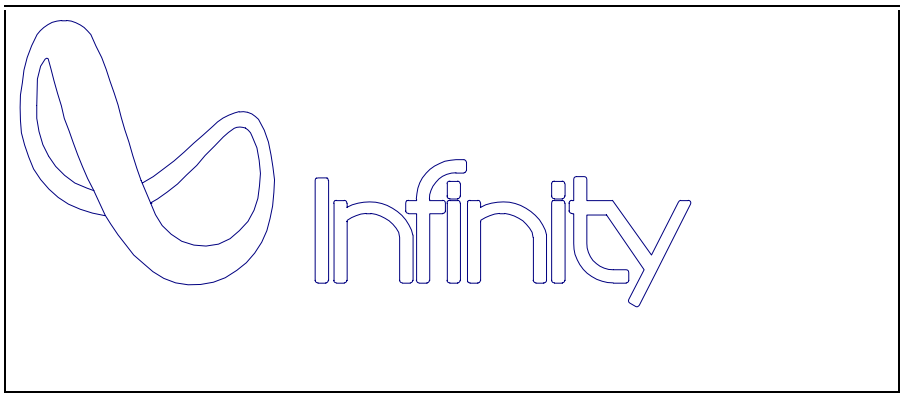
VIII FRONT CABINET LED DOES NOT GO OFF WITH ECU ACTIVE, AFTER DELAY (and no output)
Could be: Defective ECU
Could be: Defective amplifier
Could be: Defective control cable

IX BOTH CABINET LED's (front and power supply) DO NOT LIGHT (and no output)
Usually: Lacking AC power source to line cord
Could be: Voltage selector switch in wrong position

X VERY LOW OUTPUT (with ECU gain full clockwise)
Usually: Defective amplifier
Could be: Defective ECU
Could be: Defective control cable
Could be: Volume control on receiver turned down

XI WOOFER SQUEAL/OSCILLATION, "BREATHING", "THUMPING", OR EXCESSIVE EXCURSION
Usually: Defective control woofer
Could be: Defective amplifier
Could be: Defective ECU
Could be: Defective control cable

XII HUM FROM WOOFER WHEN ACTIVE
Could be: Defective amplifier
Could be: Defective ECU
Could be: Defective control cable
Could be: Defective (customer) signal input cable to ECU
Could be: Ground loop problem requiring 3 to 2 prong "cheater" plug on power cord



TECH TIP

We strongly suggest a voltage is checked before a Modulus amplifier replacement takes place. It deals with the output voltage coming from the toroidal transformer (power supply). **A small number of units were manufactured with the power supply miswired, resulting in a higher than normal supply voltage.** The supply is mounted and located on the inside of the base where the switch/controls are. After removal from the subwoofer cabinet, notice there are two cables coming from the power supply. The one to check is the larger, three wire cable. With both cables unplugged from the amplifier, of course, plug the power supply in and turn it on. Check the **blue-blue wire** voltage terminated at the end of the molex connector with a multimeter set on AC. It should be **76 - 80 volts AC. If it is 90 - 95 volts the supply is miswired — and if the subwoofer is reassembled in this condition the amplifier assembly is probably going to fail some time in the future.**

If the voltage is correct, read no further**. But if the voltage is high here are the instructions for the rework:**

1. After removal, turn the power supply/base towards you so you are facing the inside (and the plastic cover covering the connections). You should be facing the base so the wires are exiting the cover on the **right** side.

2. Remove the four 11/32" nuts attaching the plastic cover to the base.

3. On the right side of the plastic cover there should be some adhesive where the wires are exiting the cover. With a box cutter, knife or similar tool make a cut around the perimeter of the cover (where the glue is) so it can be pried up. **NOTE: Not all the glue has to be pried up or cut off, particularly in the area of the wires. Too much enthusiasm will result in a cut wire - USE CAUTION.**

4. Pry the plastic cover up and away from the base board. The right side may still be attached with glue. All internal connections should now be exposed.

5. **The two connections which must be "swapped" are the ones the pink and violet wires are attached to.** Unplug these wires and replace in each other's location.

6. Replace the plastic cover and bolt down with the four nuts.

7. **The cover must be re-glued with hot glue, silicon seal or similar adhesive** to form an airtight seal at the cover on the wire side. Failure to do so may result in an air leak, adversely affecting the subwoofer's future performance.

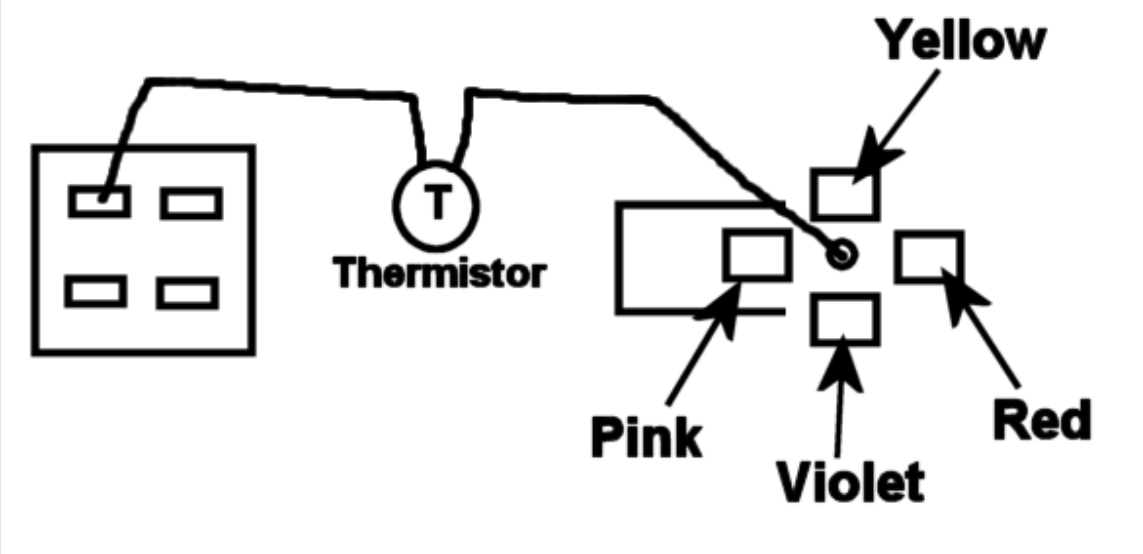
8. Power up and check previous wires (at the molex connector) for 76 - 80 VAC.

TECH TIP (cont'd)

For correction of 91+ v

(Solution – switch pink-violet transformer wires)

Correct Power Supply Wiring Diagram



REMOVAL/INSTALLATION OF MODULUS SUBWOOFER AMPLIFIER (036-4393)

I REMOVAL

1. Lay cloth or other protection under cabinet, lay unit down so that you are viewing the base (where the switch & fuse are). Amplifier/heatsink should be at the top left corner at this point.

2. Unplug all external cables from unit (except on early models when the AC power cord is attached to the base).

3. Remove all phillips screws around the perimeter of the base plate (12). Do not remove center screws.

4. Base should now be removed from cavity. Because there is no protrusion to grab on to and there is a gasket around the edges, screw one of the "feet" back into the T-nut on one of the corners (or a similar bolt) so you have something to tug on. When the base is removed completely you will see 2 cables on the base attached to the amplifier. These are "molex" connectors, and by reaching up to the point(s) where they are attached to the amplifier and **squeezing the connector** they can be removed. **The tab/catch on each connector faces away from you** (towards the top of the cabinet). At this point you may have to remove some or all of the dacron filler in the cabinet. After removal, set the base off to the side.

   Note: On some very early versions the smaller cable is so short the base cannot be removed enough to get your hand inside the unit to unclip its molex connector. ***In this case the woofer must be removed first to work through the opening.***

5. **Cut** the two LED wires at about the midway point. Do not try to remove the LED from the cabinet.

6. The woofer must be removed from the cabinet to access both sets of soldered terminals (or clips on some versions): (8) allen screws. Cut, unsolder or unclip both the (red and red w/stripe) main cables and the accelerometer cable (grey, 3 wire) from their attached points. Note both the polarity of the main cables and the three leads from the accelerometer. (More detail on this during re-assembly.)

7. Remove (4) phillips screws holding the amplifier in place. Two are close (near the base), two are deep in the cavity (at the top of the box). One screw is not visible at all but its position can be determined from the screws you've already removed.

8. With all screws out, grab the heatsink and turn it clockwise (when you are facing the base). It should break free of the sealant and move about an inch in its slot. Now carefully pull the amplifier towards the base and completely free of the slot.

II INSTALLATION

Is basically a backwards sequence from the above steps. Here are some additional notes:

On # 6: The polarity of both the main woofer cables and the accelerometer cable is **very important**. On the main cable, the solid red wire should be soldered (or clipped) to the woofer terminal with the red mark. On the 3-wire accelerometer cable where the small circuit board is present on the woofer, the locations are as follows:

Red or white lead:	"J4" on the circuit board
Bare wire:	"J5" on the circuit board
Black lead:	"J6" on the circuit board

Note: On earlier versions of the control woofer no PC board is present on the woofer, the attachment point is simply a 3 point barrier strip. On this version:

Red or white lead:	The red mark on the barrier strip
Bare wire:	The middle point
Black lead:	Opposite from the red mark

On # 5: The two LED wires should be connected by stripping, soldering and protected by heat shrink tubing or electrical tape. Or small "wire nuts" can be used. Observe polarity (color).

On # 4: When re-filling the cabinet with dacron, try not to stuff the dacron too aggressively in the area of the woofer cone. It could impede its movement. When attaching the molex connectors back on the amplifier, you may need a flashlight to see the smaller molex connector (its position is in the center of the amp). Another technique is to install the woofer last and work through the woofer hole. The squarish molex connectors will only attach one way: **The tab/catch on each connector must face away from you** (towards the top of the cabinet).

On #8: There is a black, non-hardening sealant on both ends of the amplifier assembly. Examine and "spread" the sealant evenly on both of the end plates before actually re-mounting the amp assembly. A lack of sealant could result in an air leak from the amplifier when music is played, adversely affecting the subwoofer's performance.

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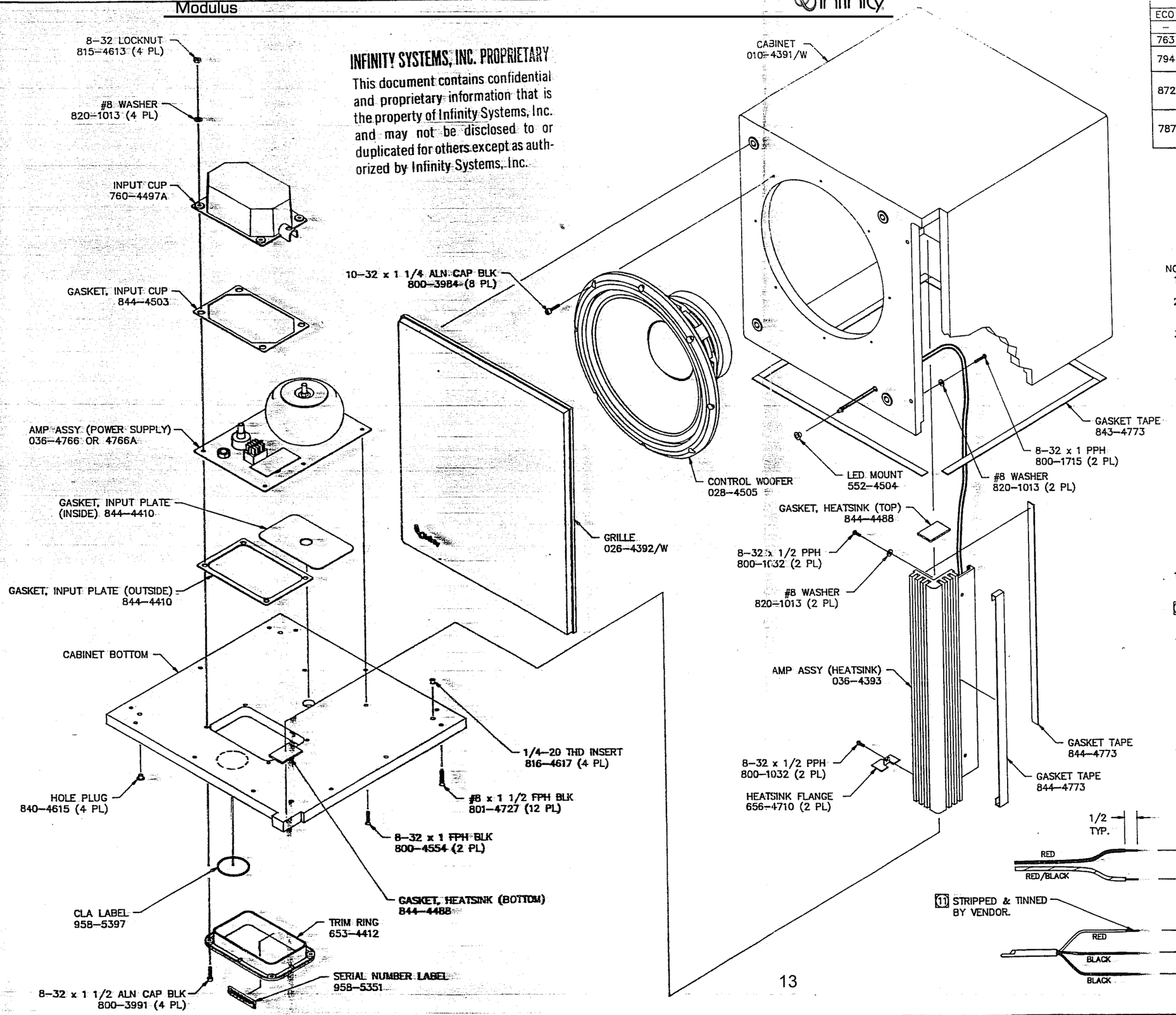
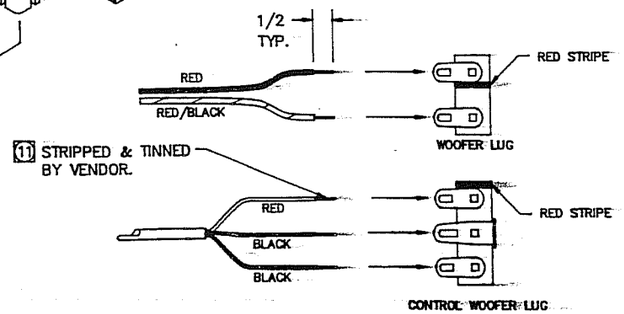
REVISIONS				
ECO	REV.	DESCRIPTION	DATE	APPROVED
–	A	RELEASE FOR PRODUCTION	03–13–90	JI
763	B	. 800–3984 WAS 800–3998	11–02–90	JI
794	C	DEL. FEMALE LUGS, 820–1014 QTY 12 WAS 8 DEL. 031–4799, 800–1032 QTY WAS 2	02–25–91	JI
872	D	REPLACE 615–5141 W/ 615–5424, 846–4397 W/ 846–5379, 760–4433 W/ 760–4084, 930–4399 W/ 930–4399A	06–13–91	JI
787	E	DEL. 957–4459 SERIAL NO. LABEL. ADD 958–5351 BAR CODE/ SER. NO./ DATE CODE LABEL.	07–17–91	

JUL 17 1991


8–32 LOCKNUT 815–4613 (4 PL)
#8 WASHER 820–1013 (4 PL)
INPUT CUP 760–4497A
GASKET, INPUT CUP 844–4503
AMP ASSY (POWER SUPPLY) 036–4766 OR 4766A
GASKET, INPUT PLATE (INSIDE) 844–4410
GASKET, INPUT PLATE (OUTSIDE) 844–4410
CABINET BOTTOM
HOLE PLUG 840–4615 (4 PL)
CLA LABEL 958–5397
TRIM RING 653–4412
8–32 x 1 1/2 ALN CAP BLK 800–3991 (4 PL)
SERIAL NUMBER LABEL 958–5351
1/4–20 THD INSERT 816–4617 (4 PL)
#8 x 1 1/2 FPH BLK 801–4727 (12 PL)
8–32 x 1 FPH BLK 800–4554 (2 PL)
GASKET, HEATSINK (BOTTOM) 844–4488
10–32 x 1 1/4 ALN CAP BLK 800–3984 (8 PL)
CONTROL WOOFER 028–4505
GRILLE 026–4392/W
CABINET 010–4391/W
GASKET TAPE 843–4773
8–32 x 1 PPH 800–1715 (2 PL)
LED MOUNT 552–4504
#8 WASHER 820–1013 (2 PL)
GASKET, HEATSINK (TOP) 844–4488
8–32 x 1/2 PPH 800–1032 (2 PL)
#8 WASHER 820–1013 (2 PL)
AMP ASSY (HEATSINK) 036–4393
GASKET TAPE 844–4773
8–32 x 1/2 PPH 800–1032 (2 PL)
HEATSINK FLANGE 656–4710 (2 PL)
GASKET TAPE 844–4773

NOTES UNLESS OTHERWISE NOTED:

1. REMOVE BOTTOM PANEL FROM CABINET AND DISCARD SCREWS. INSTALL FOUR 1/4–20 THD INSERTS (816–4617) IN BOTTOM PANEL.
2. REMOVE CENTER FROM INPUT PLATE GASKET (844–4410), AND PLACE IT OVER C'BORE ON THE INSIDE OF CABINET BOTTOM. CENTER OUTSIDE OF GASKET AROUND OPENING IN CABINET BOTTOM.
3. PLACE AMP ASSY "POWER SUPPLY" (036–4766) ON ASSY FIXTURE. FEED POWER CORD (POWER SUPPLY) THRU OPENING IN CABINET BOTTOM AND THRU TRIM RING (653–4412). MOUNT USING FOUR 8x32–1 1/2 ALN CAP BLK (800–3991) AND TWO 8–32x1 FPH BLK (800–4554) AT THE REAR.
4. PLACE INPUT CUP GASKET (844–4503), ONTO INPUT CUP (760–4497A) THEN ARRANGE WIRES TO FIT THRU MOUSE HOLE AND MOUNT INPUT CUP ONTO STUDS ON INPUT PLATE WITH FOUR 8–32 LOCKNUTS (815–4613) AND FOUR #8 FLAT WASHERS (820–1013). APPLY HOTMELT (855–0747) THRU HOLE IN INPUT CUP TO SEAL WIRES.
5. PLACE HEATSINK GASKET (844–4488) ONTO TONGUE OF CABINET BOTTOM SO .06 HANGS OFF EACH SIDE.
6. PLACE GASKET TAPE (843–4773) ON TONGUE OF HEATSINK (WRAP AROUND TOP AND BOTTOM) PLACE TAPE ALONG INSIDE JUST BEHIND MOUNTING HOLES. (SEE SHEET 2 OF 3).
7. PLACE HEATSINK GASKET (844–4488), ONTO TONGUE OF CABINET TOP SO .06 HANGS OFF EACH SIDE.
8. MOUNT TWO HEATSINK FLANGES (656–4710) TO TOP AND BOTTOM OF HEATSINK USING TWO 8–32 x 1/2 PPH (800–1032). PLACE CAULK STRIP PER SHEET 2 OF 3
9. POSITION AMP ASSEMBLY "HEATSINK" (036–4393), INTO OPENING IN CABINET. MOUNT AMP ASSEMBLY USING TWO 8–32x1/2 PPH (800–1032), TWO 8–32x1 PPH (800–1715). AND FOUR 8–32 WASHERS (820–1013).
10. PUSH LED THRU HOLE IN CABINET, INSTALL LED MOUNT (552–4504) ONTO LED AND PUSH ASSY BACK INTO CABINET HOLE. SEAL LED ASSY FROM INSIDE USING CAULK.
11. SOLDER LEADS FROM AMP. TO CONTROL WOOFER (028–4504) PER WIRING DIAGRAM. MOUNT CONTROL WOOFER TO CABINET USING EIGHT 10–32x1 1/4 ALN CAP BLK (800–3984).
12. PLACE GASKET TAPE (843–4773) ALONG INNER PERIMETER OF CABINET ROUT.
13. FILL CABINET WITH 800 GRAMS OF DACRON (875–1121).
14. POSITION CABINET BOTTOM OVER CABINET AND CONNECT TWO MOLEX FROM AMP ASSEMBLY "POWER SUPPLY" TO AMP ASSEMBLY "HEATSINK".
15. MOUNT CABINET BOTTOM ONTO CABINET USING TWELVE #8x1 1/2 FPH BLK (801–4727).
16. INSTALL FOUR HOLE PLUGS (840–4615) INTO THD INSERT HOLES IN CABINET BOTTOM.
17. PLACE SERIAL NUMBER (958–5351) TRIM RING AS SHOWN. PLACE CLA LABEL (958–5397) ON THE BOTTOM PANEL ABOVE THE AMP ASSEMBLY.
18. CLEAN CABINET AND ATTACH GRILLE (026–4392/W).



Infinity Systems Inc.	
12" SUBWOOFER	
FINAL ASSEMBLY	
P/N: IF999912B/W	
DWG NO: IF999912B/W–01003–32B	
DRAWN BY: B. Frank	
DATE: 01–28–90	SCALE: 1/2x
APPROVED: J. Irish 4-5-90	
MATERIAL: SEE NOTES	
FINISH: SEE NOTES	
TOLERANCES: ANG: ± = .5° FRACT: ± = 1/32 DECIMALS: .XX ± = .01 .XXX ± = .005	
REVISION : E	SHEET: 1 OF 3

MODULUS AMPLIFIER ADJUSTMENT

(Performed with the Amplifier out of the cabinet)

Attach the amplifier to the power supply (using both molex connectors) and to the ECU (with the grey control cable) just like it would be powered if it were fully assembled. The following describes a method to drive the amplifier at a certain input voltage and frequency from the ECU, and to take measurements at two different frequency points (low and high) at the output of the amplifier. It also describes the approximate correct pot positions of VR1, VR2 & VR3.

Place VR1 = approx. middle position

Connect and power up the amp (to power supply and ECU). **Do not attach any load to the amp output (woofer) cables or to the three-wire feedback cable during this test.** Connect a function/signal generator the RCA input jacks of the ECU, **both channels** (use a Y-cable if necessary).

ECU CONTROLS:

LEVEL - FULL CW
PHASE - "0"
CROSSOVER - FULL CW
22/35 Hz - 22 Hz Position

TEST #I: 10mV, 20 Hz input to the ECU should yield: 1.95 volts at output (red wires)
TEST #2: 10mV, 300 Hz input to the ECU should yield: 445 mV at output (red wires)

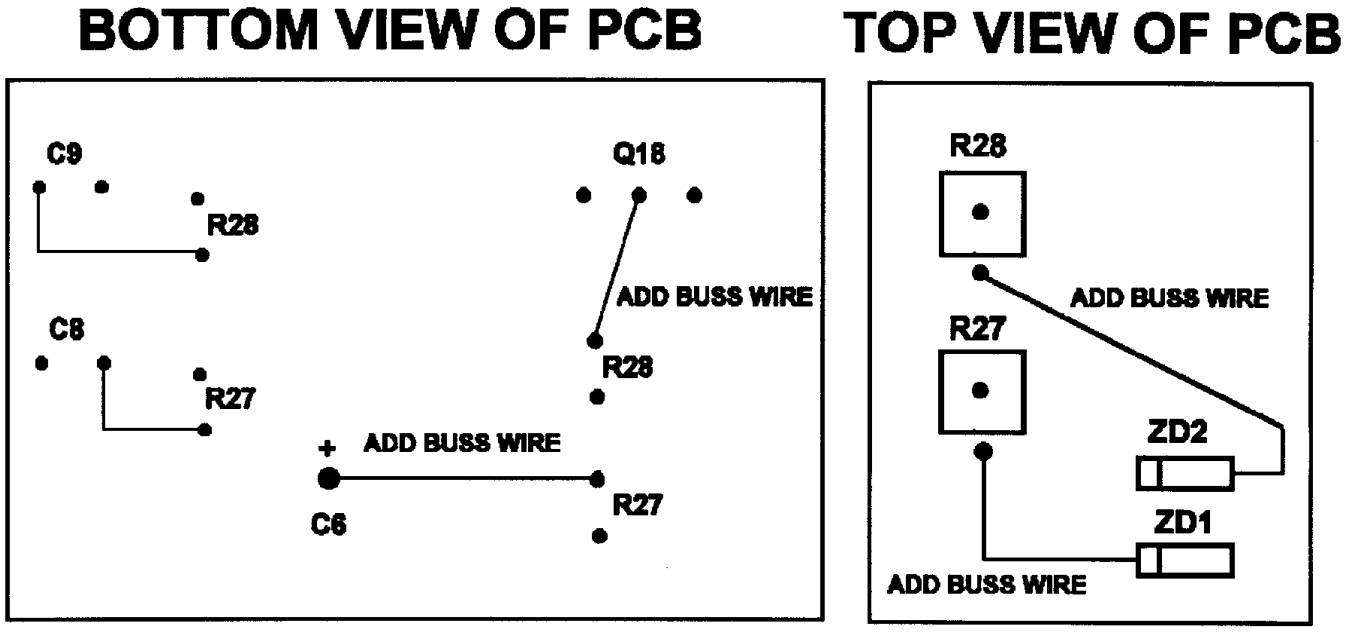
VR2 - 2/3 to 3/4 CW Note: Adjusting VR2 only changes the **upper** frequency range
VR3 - Nearly or full CW Note: Adjusting VR3 changes output all frequencies

The variable resistor (pot) on the small board **on the woofer** is normally full Clockwise.

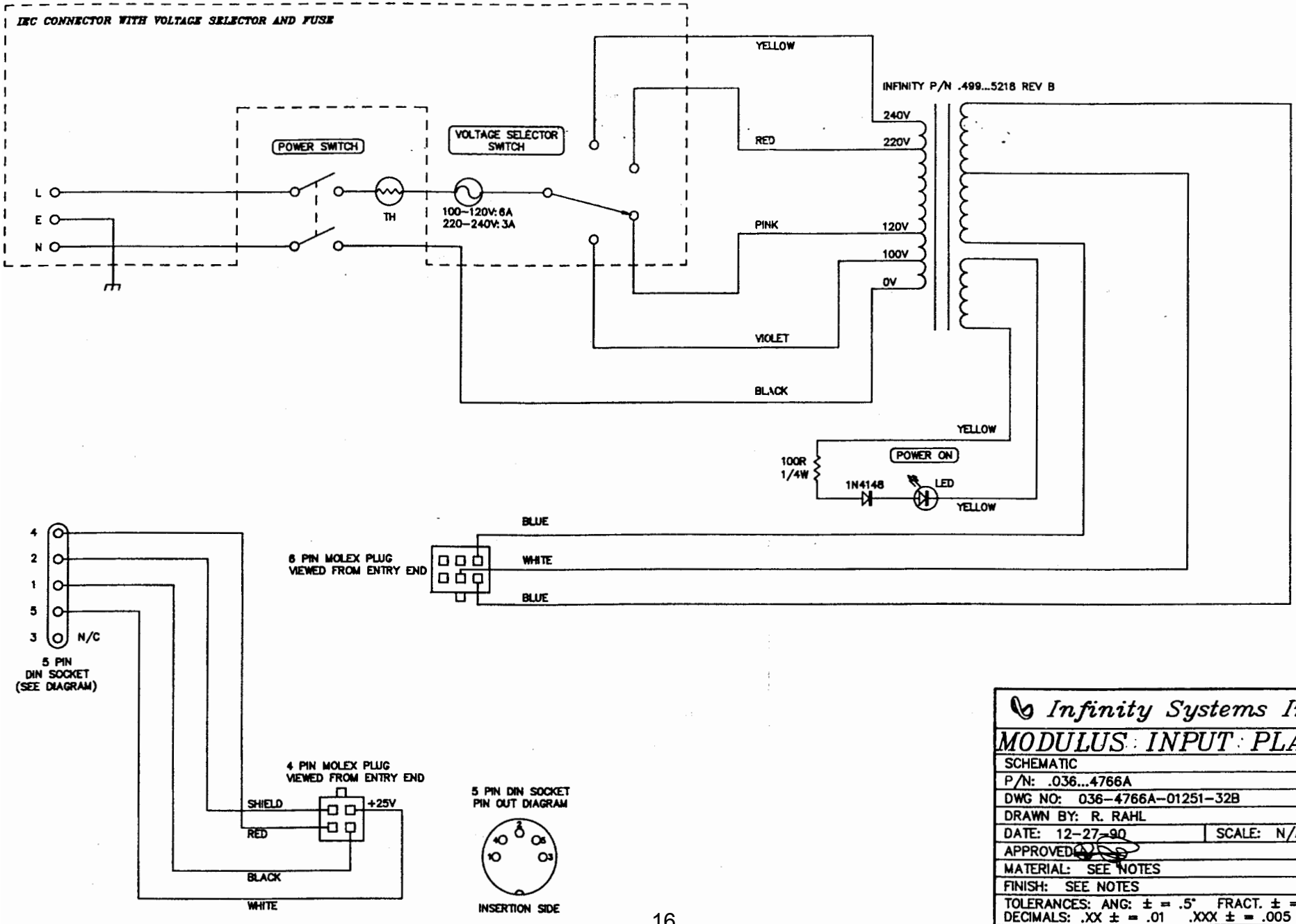
MODULUS PC BOARD REPAIR

In the event that the Modulus amplifier PC board is charred in the area of R27 & R28 and the traces/connections on the board seem unrepairable, follow the procedure below to repair such a unit:

1) Replace power resistors R27 & R28. (Infinity part number 280-CR5-820)
2) Inspect & test zener diodes ZD1 & ZD2. (Infinity part number 307-8126) Replace if defective.
3) Refer to drawing below, making buss wire connections where noted.
4) Power up amplifier from cabinet power supply; check all DC voltages before installation.



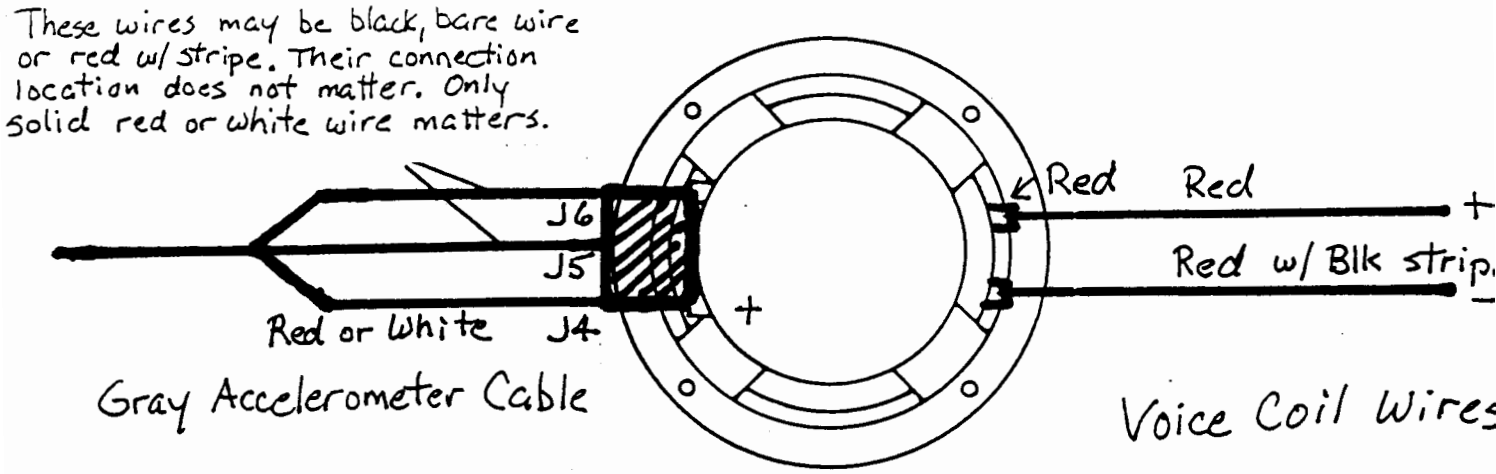
REVISIONS				
ECO	REV.	DESCRIPTION	DATE	APPROVED
734	A	RELEASE FOR PRODUCTION	12-27-90	RP
825	B	CORRECT TO PRODUCTION SPECS.	03-04-91	



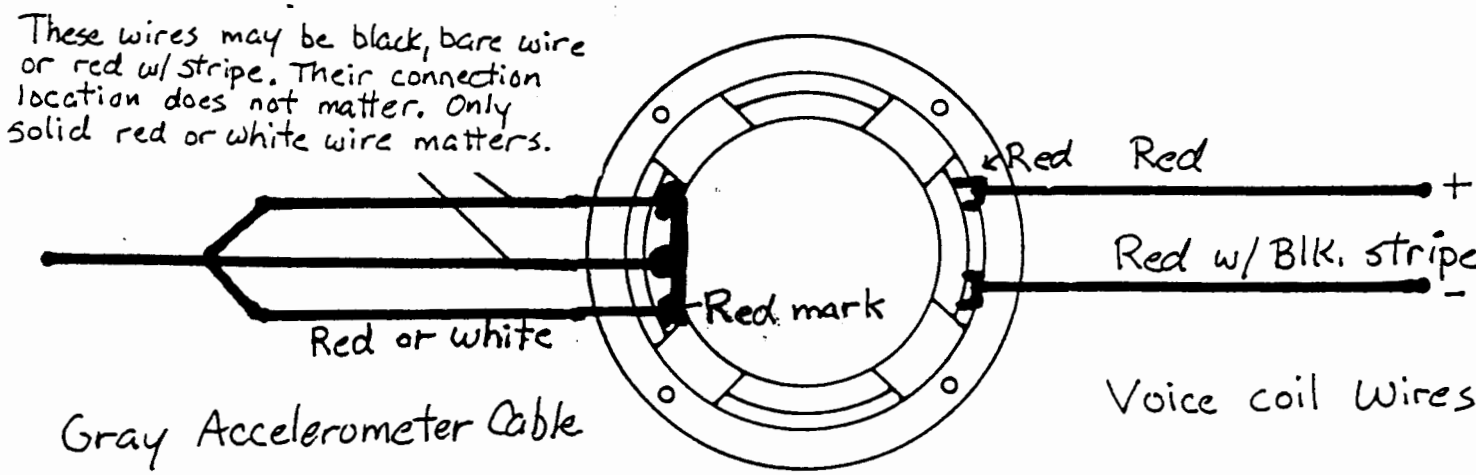
Infinity Systems Inc.	
MODULUS INPUT PLATE	
SCHEMATIC	
P/N: .036...4766A	
DWG NO: 036-4766A-01251-32B	
DRAWN BY: R. RAHL	
DATE: 12-27-90	SCALE: N/A
APPROVED:	
MATERIAL: SEE NOTES	
FINISH: SEE NOTES	
TOLERANCES: ANG: ± = .5° FRACT. ± = 1/32 DECIMALS: .XX ± = .01 .XXX ± = .005	
REVISION: B	

MODULUS CONTROL WOOFER (A028-5822) CONNECTIONS

VERSION WITH CIRCUIT BOARD

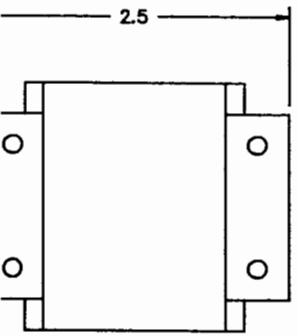


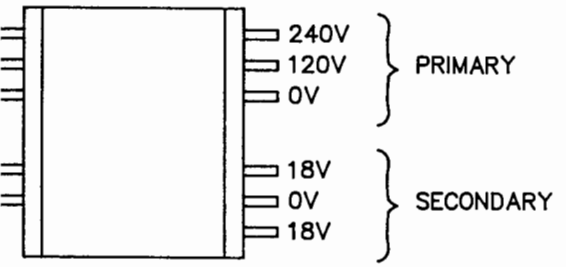
VERSION WITH 3 LUG TERMINAL STRIP


These wires may be black, bare wire or red w/ stripe. Their connection location does not matter. Only solid red or white wire matters.
Red or White
Red mark
Gray Accelerometer Cable
Red
Red
Red w/ Blk. stripe
+
+
Voice coil Wires

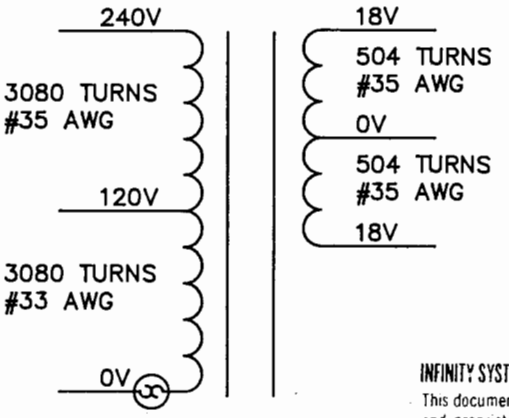
REVISIONS				
ECO	REV.	DESCRIPTION	DATE	APPROVED
–	A	RELEASE FOR PRODUCTION	10–11–90	GS
802	B	ADD NOTES 4–7; ADD BOTTOM VIEW; ADD DIAGRAM A	05–13–91	RP

Infinity





PIN DIAGRAM
SEEN FROM BOTTOM



TC

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NOTES:

1. CORE: UI50 SQUARE STOCK
   MATERIAL: M–6 OR M–19
2. BOBBIN: PLASTRON OR EQUIVALENT
   0961A–31–90 WITH FLANGE
3. THERMAL CUTOFF: MICROTEMP P/N 4244
4. EXCITATION CURRENT: 2mA MAX @ 120V, 60 Hz
5. MUST BE UL, CSA, AND SEMKO CERTIFIED
6. STICKER TO BE PLACED ON TOP OF TRANSFORMER (SEE DIAGRAM A), VENDOR TO CHOOSE STICKER SIZE
7. VENDOR: JACKSON P/N Z–3 OR ENGINEERING APPROVED EQUIVALENT

DIAGRAM A

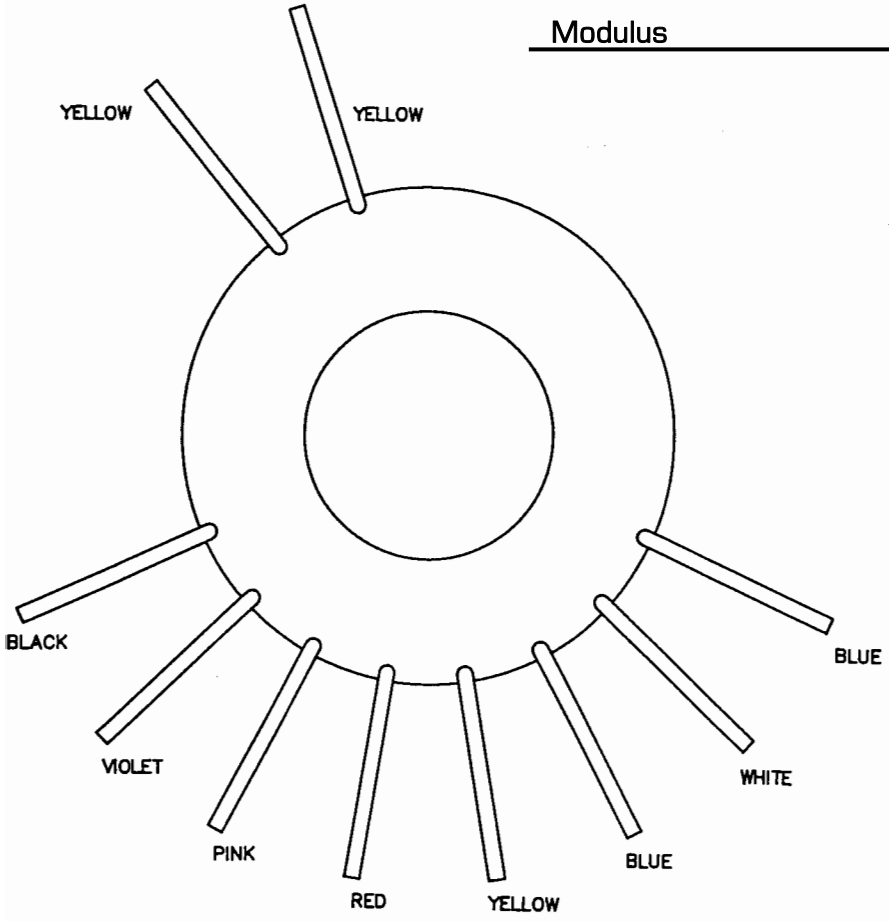
INFINITY SYSTEMS, INC.
P/N: 415–5241
REV: B

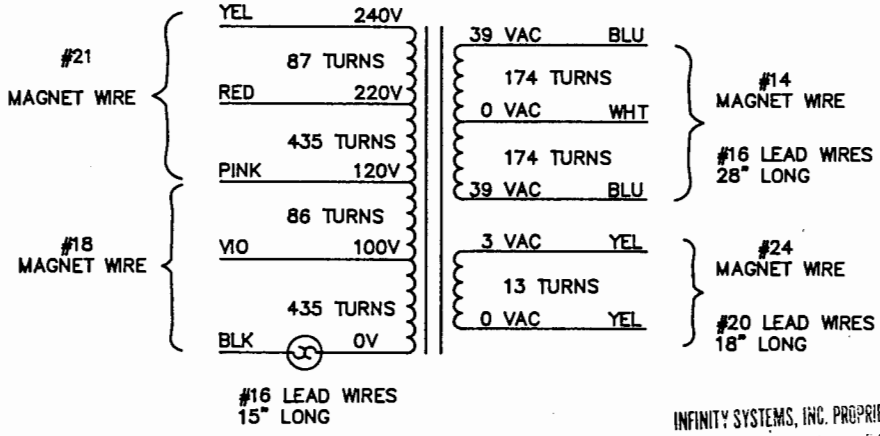
Infinity Systems Inc.	
MODULUS ECU	
TRANSFORMER SPECIFICATION SHEET	
P/N: .415...5241	
DWG NO: 415–5241–01109–328	
DRAWN BY: R. RAHL	DATE: 10–11–90
APPROVED:	SCALE: N/A
REVISION : B	PAGE 1 OF 1

REVISIONS				
ECO	REV.	DESCRIPTION	DATE	APPROVED
–	A	RELEASE FOR PRODUCTION	10-03-90	GS
793	B	UPDATE TO NEW PROD SPECS.	01-28-91	RP
802	C	COMPLY WITH CSA CERTIFICATION STDS.	05-14-91	RP

Infinity

Modulus





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NOTES:

1. CORE SPECIFICATIONS:
   OUTER DIMENSION: 4.00"
   INNER DIMENSION: 2.5"
   HEIGHT: 1.5"
2. CORE TO BE INSULATED WITH 30 MIL POLYPROPYLENE
3. INSULATION BETWEEN PRIMARY AND SECONDARY TO BE POLYPROPYLENE 20 – 30 MIL THICKNESS
4. LABEL TO BE PLACED UNDER FINAL TAPE WRAP (SEE DIAGRAM A), VENDOR TO CHOOSE LABEL SIZE
5. THERMAL PROTECTOR:
   MFG: PORTAGE ELECTRONIC PRODUCTS, INC.
   MODEL: G
   UL FILE: E42562
6. PART TO BE UL, CSA, AND SEMKO CERTIFIED
7. EXCITATION CURRENT: 15mA MAX @ 120V – 60Hz
8. POWER RATING: 320 VA

DIAGRAM A

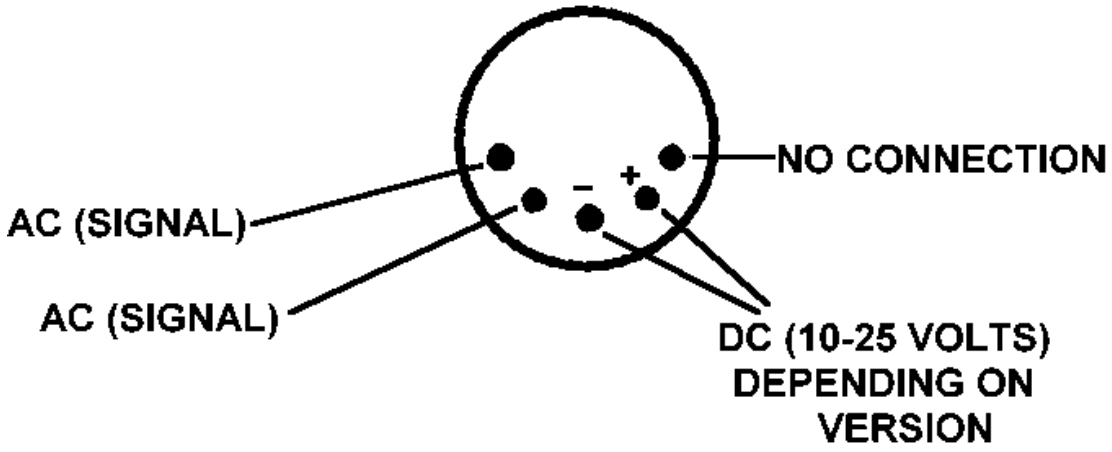
INFINITY SYSTEMS, INC.
P/N: 499-5218
REV: C

ACAD FILE: MOD\SBWFR\4995218

Infinity Systems Inc.	
MODULUS SBWFR	
POWER TRANSFORMER	
P/N: .499...5218	
DWG NO: 499-5218-01015-328	
DRAWN BY: R. RAHL	DATE: 10-03-90
APPROVED:	SCALE: 1/1
REVISION: C	PAGE 1 OF 1

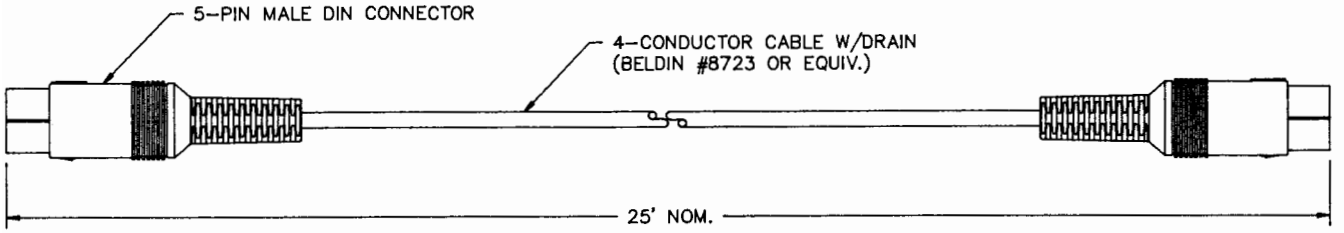
MODULUS DIN CABLE (639-4458A) PINOUT

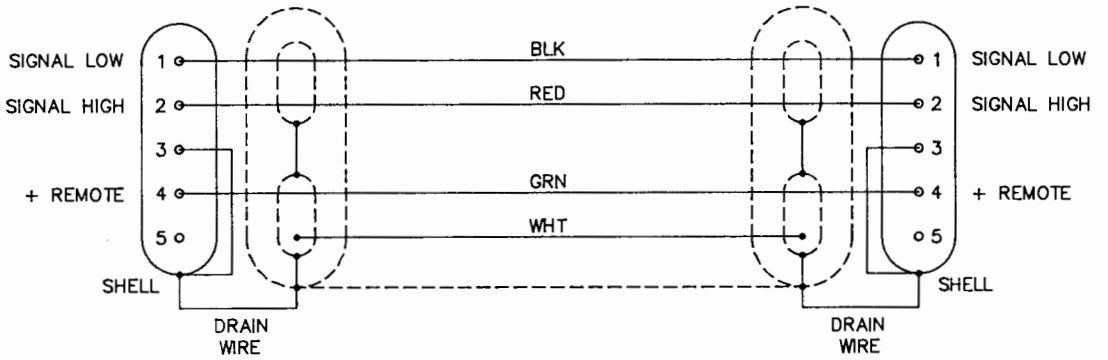
Below are the pin outputs to the five pin Din cable; it is depicted when the cable is plugged into the ECU (turned ON) and you are facing the opposite end of the plug.



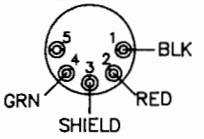
REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED
A	RELEASE FOR PROD.	07-25-89	BHK
B	CHG LENGTH; DEL LOCKING DIN; ADD PINOUT	08-31-89	BHK
C	ECO 704: CHG FROM 4 TO 3 COND. CABLE	05-03-90	

Infinity





BACK VIEW:
SOLDER SIDE

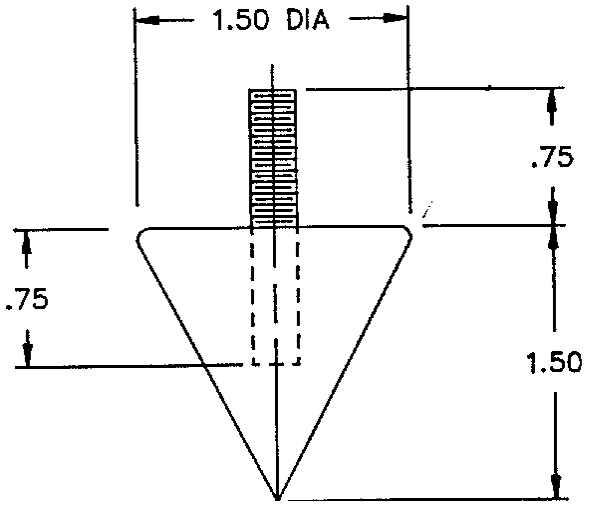


Infinity Systems Inc.	
12" Subwoofers	
SIGNAL/CONTROL CABLE	
P/N: .639...4458	
DWG NO: 639-4458-00954-32B	
DRAWN BY: B.Cooper	DATE: 07-11-89
APPROVED:	SCALE: 1X
REVISION : C	PAGE 1 OF 1

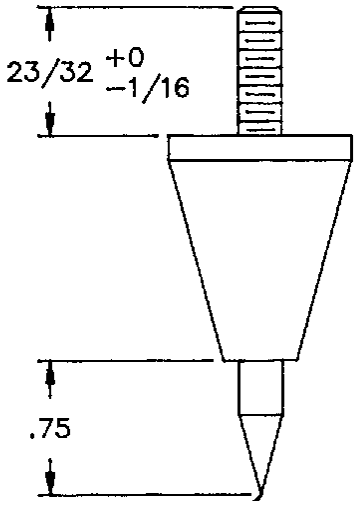
MODULUS MECHANICAL PARTS LIST

Description	Part Number
Grille (Black)	A026-4392
Grille (White)	A026-4392W
12” Control Woofer (2 ohm DCR)	A028-5822
Din Cable assembly (25”)	639-4458A
Sub Power Cord (6’)	615-5141
Sub Power Cord (6’) 90 degree head	615-5424
Power Cord (6’) for ECU	615-5428
5-pin Fem-Fem Din Adapter	539-4469
Feet (4) See drawing below	846-4397
Feet (4) See drawing below	846-5379
Foot cover for 846-4397	760-4433
Foot cover for 846-5379	760-4084
Owner’s manual	930-4399A

846-4397



846-5379



MODULUS SUBWOOFER
AMPLIFIER CIRCUIT PARTS LIST
.036...4393
CIRCUIT BOARD REVISION: E
SCHEMATIC REVISION: E
APRIL 14, 1992
SUPERSEDES ALL PREVIOUS PARTS LIST

NOTE: TO BE USED FOR REFERENCE ONLY DUE TO LACK OF VALID INFINITY PART NUMBERS. COMPONENTS WITH VALID PART NUMBERS APPEAR ON LAST PAGE OF PARTS LIST

FOR ALL OTHER PARTS CALL INFINITY CUSTOMER SERVICE FOR SUBSTITUTES

RESISTORS

¼ WATT, 5%, CARBON FILM

R3,R6,R12,R32	100 Ω
R2,R14,R15	270 Ω
R40	470 Ω
R8	560 Ω
R60	680 Ω
R51	820 Ω
R5,R13,R52,R59,R65,R66	1K Ω
R10	1.5K Ω
R31	2.2K Ω
R30,R34,	3.6K Ω
R9	4.3K Ω
R1,R7,R11,R26,R33,R37,R38,R42,R54,R67	10K Ω
R48,R49,R50	13K Ω
R64	22K Ω
R29,R43	33K Ω
R61,R62,R63	47K Ω
R57	51K Ω
R53	200K Ω
R55	1M Ω

¼ WATT, 1%, CARBON FILM

R35,R36	4.99K Ω
R58	9.09K Ω
R41,R56	102K Ω

½ WATT, 5%, CARBON FILM

R16	100 Ω

1 WATT, 5%, CARBON FILM

R4	10K Ω
R25	2.7 Ω

5 WATT, 10%, WIRE WOUND

R27,R28	820 Ω
R17,R18,R19,R20,R21,R22,23,R24	0.1 Ω

MODULUS SUBWOOFER CONT.

CAPACITORS

CERAMIC DISK - 5%, 100V

C3,C4	100pF

ELECTROLYTIC - RADIAL LEAD, 20%

C22	10µF, 35V
C11,C12	47µF, 35V
C21	220µF, 10V
C8,C9,C20	1,000µF, 16V
C6,C7	10,000µF, 63V

NON-POLARIZED ELECTROLYTIC - RADIAL LEAD, 20%

C1,C2,C10	47µF, 16V

POLYESTER FILM, 5%, 100V

C13,C23	10nF
C27	47nF
C29	68nF
C5	470nF
C25	560nF
C28	680nF
C24,C26	1µF

DIODES

D1,D2,D9	1N4148
D3,D4,D7,D8,D10	1N4004
D5	FEP16DT
D6	FEN16DT
ZD1,ZD2	1N5353B
LED1	DIALIGHT P/N 521-9240 INFINITY P/N 311-4964

TRANSISTORS

Q1,Q2,	2SA1038
Q3	2SA935
Q4,Q8	2SB1186A
Q5,Q23	MPSA12
Q6,Q7	2SD1763A
Q9,Q11,Q12,Q13,Q14	TIP35C
Q10,Q15,Q16,Q17,Q18	TIP36C
Q19,Q20,Q22,Q25	2SC2389
Q21	2SC2061
Q24	7812 (VOLT REG)

POTENTIOMETERS

VR1	2.2K Ω* .25 DIA .20 LEAD SPACE HOR. MOUNT
VR2	220K Ω* .25 DIA .20 LEAD SPACE HOR. MOUNT
VR3	20K Ω* .25 DIA .20 LEAD SPACE HOR. MOUNT

MODULUS SUBWOOFER CONT.

INTEGRATED CIRCUITS

IC1	LF347N
IC2	LF353N

MISCELLANEOUS

TH1	NTC THERMISTOR
	US SENSOR 104JGIK 100K @ 25°C
K3 RELAY	INF # 510-5982,ITT VS48MCU-NR
MOLEX 1 (6 PIN)	MOLEX P/N 39-28-1063
MOLEX 2 (4 PIN)	MOLEX P/N 39-28-1043
SHRINK SLEEVING (1/8" I.D.)(QTY 2)	38mm (LED LEADS)
SHRINK SLEEVING (1/8" I.D.)(QTY 2)	15mm (3 CNDCTR WIRE)
TYWRAP	INFINITY P/N (861-4914)
HEAT SINK FABRICATION FLANGE	INFINITY P/N 654-4710
TRANSISTOR MOUNTING PLATE	INFINITY P/N 707-5479
INSULATOR STRIP	INFINITY P/N 731-4378
TRANSISTOR MOUNTING SCREW (4)	#8-32 x 1/2" ALN CAP
WASHER (4)	#8 LOCK WASHER
#8 LUG	KEYSTONE P/N 905
P C BOARD	REFER TO SUPPLIED ARTWORK
HEATSINK FABRICATION	INFINITY P/N 730-4668

WIRES

14 AWG RED (WIRE1)	673mm (SPKR POSITIVE)
14 AWG RED/BLACK (WIRE2)	673mm (SPKR NEGATIVE)
18 AWG BLACK	83mm (GROUND WIRE)
20 AWG RED	673mm (LED ANODE)
20 AWG BLACK	673mm (LED CATHODE)
3 CONDUCTOR WIRE 673mm	ORA ELEC. ATP 025-16/16G

PART#	DESCRIPTION
RS1868	(R17-24) 0.1 ohm, 5W WW 10% Resistor
306-0798	1N4004 DIODE
306-0805	1N4148 DIODE
306-8042	FEP16DT DUAL DIODE
306-8043	FEN16DT DUAL DIODE
307-8126	IN5353B 16V 5W ZENER DIODE
325-4258	LF347N IC
325-6548	LF353N IC
50363	MPSA12 TRANSISTOR
347-3982	TIP 36C TRANSISTOR
347-3989	TIP 35C TRANSISTOR
347-8029	2SD1763A TRANSISTOR
347-8030	2SB1186A TRANSISTOR

Infinity

REVISIONS				
ECO	REV.	DESCRIPTION	DATE	APPROVED
734	B	CONFORM TO PROD SPECS	12-27-90	RP
820	C	CORRECT TO PRODUCTION SPECS	03-06-91	RP
935	D	CORRECT VALUES OF R35,R36,R58	10-21-91	RP
1012	E	C2 WAS 220uF, C5 WAS 100nF	04-13-92	

4 PIN MOLEX SOCKET VIEWED FROM ENTRY END

+25V

R35 4.99K 1%

R38 10K

R36 4.99K 1%

R37 10K

IC1 1/4 LF347N

+16V IC2 1/2 LF353N -16V

+16

Q24 7812

C21 220uF 10V

R51 820R

R52 1K

ACCEL

BLACK

RED

BLACK

C22 10uF 35V

R53 200K

LF STABILITY

R57 51K

VR2 220K

C24 1uF

R54 10K

R55 1M

C23 10nF

R56 102K 1%

IC2 1/2 LF353N

IC1 1/4 LF347N

R58 9.09K 1%

VR3 20K

C26 1uF

α FEEDBACK

R60 680R

C25 0.56uF

R59 1K

R62 47K

R61 47K

C27 47nF

IC1 1/4 LF347N +16V -16V

R63 47K

R64 22K

C28 .68uF

R65 1K

C29 .068uF

R66 1K

C1 47uF 16V NPE

R1 10K

Q1 2SA1038

+54V

D1 1N4148

D2 1N4148

R2 270R

Q3 2SA935

R3 100R

Q4 2SB1186A

R6 100R

R4 10K 1W

Q2 2SA1038

R8 560R

C2 47uF 16V NPE

R7 10K

Q5 MPSA12

R9 4.3K

R10 1.5K

VR1 2.2K

R11 10K

C13 10nF

C3 100pF

C4 100pF

Q6 2SD1763A

Q8 2SB1186A

R5 1K

R12 100R

Q7 2SD1763A

R14 270R

Q9 TIP35C

R13 1K

R16 100R 1/2W

R15 270R

Q10 TIP36C

Q11 TIP35C Q12 TIP35C Q13 TIP35C Q14 TIP35C

R17 0.1R 5W WW 10% R18 0.1R 5W WW 10% R19 0.1R 5W WW 10% R20 0.1R 5W WW 10%

D3 1N4004

R21 0.1R 5W WW 10% R22 0.1R 5W WW 10% R23 0.1R 5W WW 10% R24 0.1R 5W WW 10%

D4 1N4004

Q15 TIP36C Q16 TIP36C Q17 TIP36C Q18 TIP36C

K3

SPEAKER OUTPUT

+ RED

− RED/BLACK

R25 2.7R 1W

R26 10K

C5 .47uF

−54V

6 PIN MOLEX SOCKET VIEWED FROM ENTRY END

D7 1N4004

D6 FEN 16

D5 FEP 16

D8 1N4004

+54V

R27 820R 5W 10% WW

C6 10,000uF 63V

ZD1 1N5353B

C8 1000uF 16V

+16V

C7 10,000uF 63V

ZD2 1N5353B

C9 1000uF 16V

−16V

R28 820R 5W 10% WW

−54V

R29 33K

R30 3.6K

Q19 2SC2389

Q20 2SC2389

R32 100R

R50 13K

R48 13K

C10 47uF 16V NPE

R31 2.2K

C11 47uF 35V

C12 47uF 35V

K3

D10 1N4004

IC1 1/4 LF347N

R33 10K

Q21 2SC2061

R34 3.6K

Q25 2SC2389

R41 102K 1%

R40 470R

C20 1000uF 16V

TH1 100K ● 25°C

R49 13K

STANDBY MODE

RED LED

D9 1N4148

R67 10K

+25V

R43 33K

Q22 2SC2389

Q23 MPSA12

R42 10K

NOTES:
1. ALL RESISTORS ARE IN OHMS
2. ALL RESISTORS ARE 5%, 1/4 WATT, CARBON FILM UNLESS OTHERWISE INDICATED

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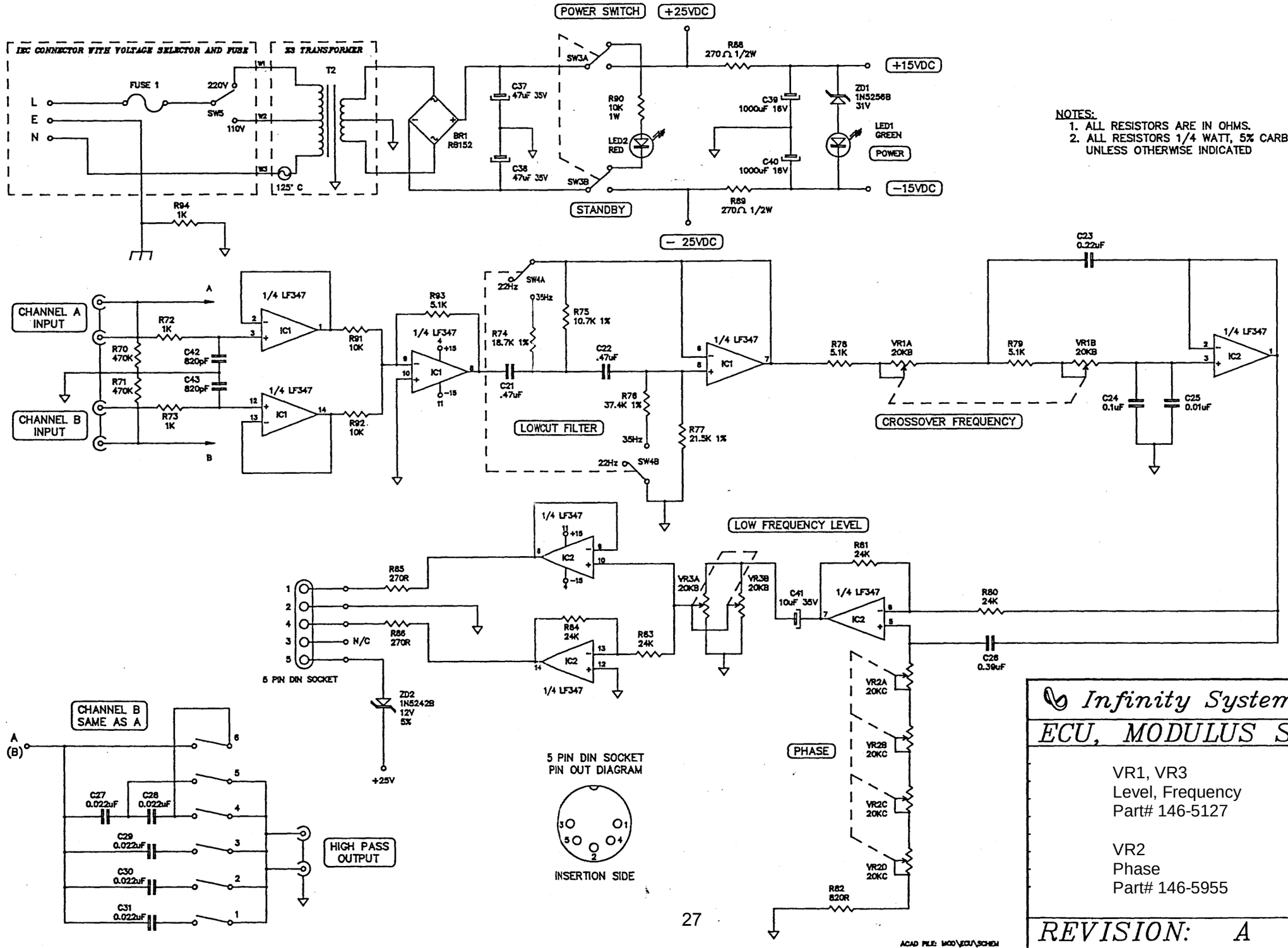
APR 16 1992

Infinity Systems Inc.	
MODULUS SUBWOOFER	
SCHEMATIC – POWER AMPLIFIER 12"	
P/N: .036...4393	
DWG NO: 036-4393-01004-32B	
DRAWN BY: R. RAHL	
DATE: 03-16-90	SCALE: N/A
APPROVED: RP	
MATERIAL: SEE NOTES	
FINISH: SEE NOTES	
TOLERANCES: ANG: ± = .5° FRACT. ± = 1/32 DECIMALS: .XX ± = .01 .XXX ± = .005	
REVISION: E	

Infinity

REVISIONS

ECO	REV.	DESCRIPTION	DATE	APPROVED
848	A	RELEASE FOR PRODUCTION	04-12-91	4-29



Infinity Systems Inc.

ECU, MODULUS SBWFR

VR1, VR3
Level, Frequency
Part# 146-5127

VR2
Phase
Part# 146-5955

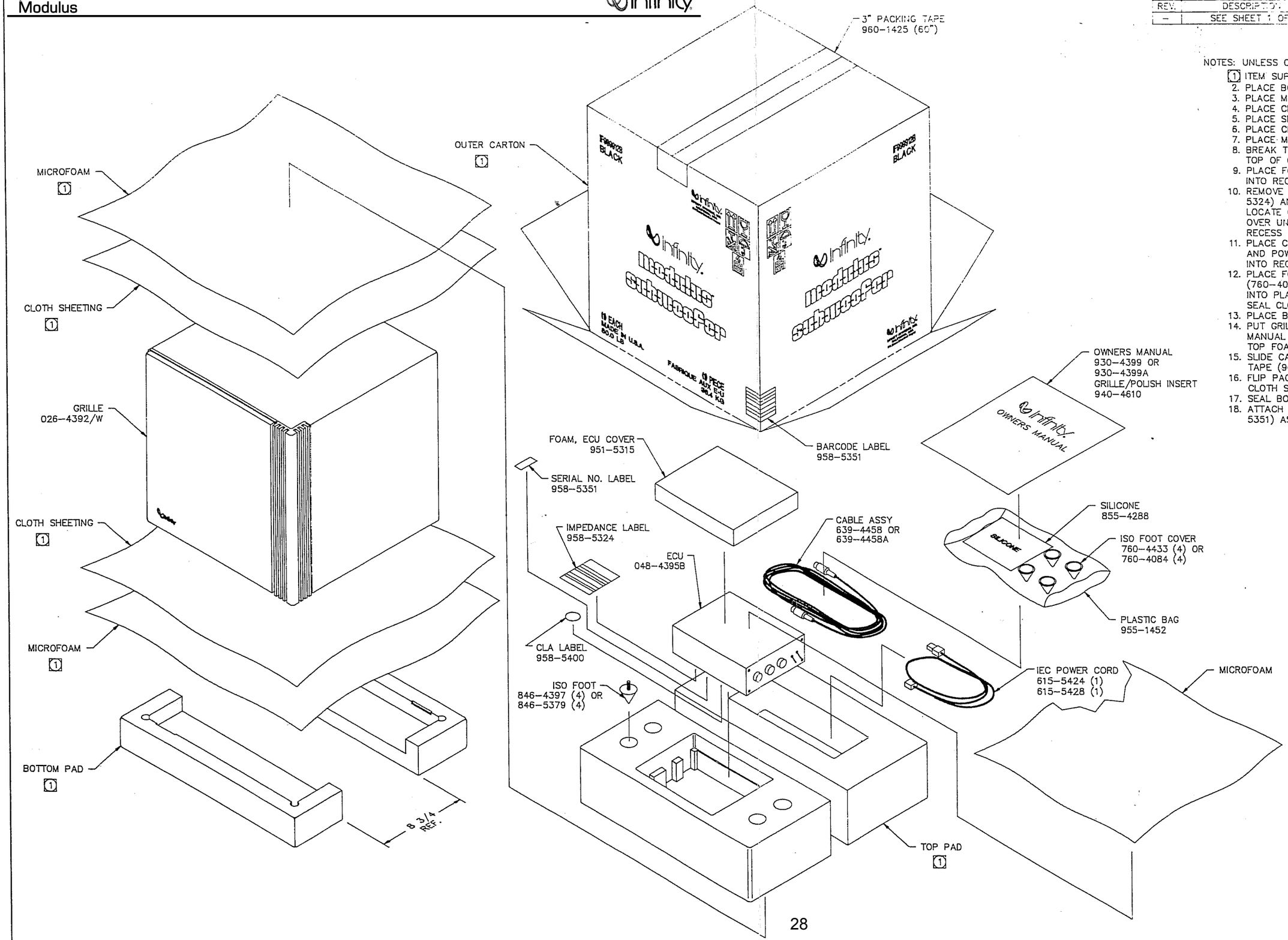
REVISION: A

ACAD FILE: MOD\ECU\SCHEM

Modulus

Infinity

REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED
–	SEE SHEET 1 OF 3		



NOTES: UNLESS OTHERWISE SPECIFIED

1. ITEM SUPPLIED BY JBL/HARMAN.
2. PLACE BOTTOM PAD ON FLOOR 8.75" INCHES APART.
3. PLACE MICROFOAM ON TOP OF BOTTOM PAD.
4. PLACE CLOTH SHEETING ON TOP OF MICROFOAM.
5. PLACE SPEAKER INTO BOTTOM PAD RECESS.
6. PLACE CLOTH SHEETING ON TOP OF CABINET.
7. PLACE MICROFOAM ON TOP OF CLOTH SHEETING.
8. BREAK TOP FOAM ALONG SPLIT LINE AND PLACE ON TOP OF CABINET AS SHOWN.
9. PLACE FOUR ISOLATION FEET (846–4397) OR (846–5379) INTO RECESS' IN FRONT TOP PAD.
10. REMOVE PAPER BACKING FROM IMPEDANCE LABEL (958–5324) AND CLA LABEL (958–5400) AND CENTRALLY LOCATE ON BOTTOM OF ECU. WRAP ELECTRONIC CROSS–OVER UNIT (048–4395B) IN MICROFOAM AND PLACE INTO RECESS IN TOP PADS.
11. PLACE CABLE ASSEMBLY (639–4458) OR (639–4458A) AND POWER CORDS (615–5424) AND (615–5428) INTO RECESS IN TOP REAR PAD.
12. PLACE FOUR ISOLATION FOOT COVERS (760–4433) OR (760–4084) AND ONE PACKET OF SILICONE (855–4288) INTO PLASTIC BAG (955–1452) AND STAPLE OR HEAT SEAL CLOSED.
13. PLACE BAG IN RECESS WITH CABLE.
14. PUT GRILLE/POLISH INSERT (940–4610) INTO OWNERS MANUAL (930–4399) OR (930–4399A) AND PLACE ON TOP FOAM PADS.
15. SLIDE CARTON OVER PACKING AND SEAL WITH PACKING TAPE (960–1425).
16. FLIP PACK OVER AND CUT SMALL SLOT IN MICROFOAM AND CLOTH SHEETING, PULL POWER CORD THROUGH SLOT.
17. SEAL BOTTOM WITH PACKING TAPE (960–1425).
18. ATTACH BAR CODE/ SER. NO./ DATE CODE LABEL (958–5351) AS SHOWN.

JUL 17 1991

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Infinity Systems Inc.	
12" SUBWOOFER	
FINAL ASSEMBLY	
P/N: IF999912B/W	
DWG NO: IF999912B/W–01003–32B	
DRAWN BY: B. Frank	
DATE: 01–28–90	SCALE: 1/4x
APPROVED:	
MATERIAL: SEE NOTES	
FINISH: SEE NOTES	
TOLERANCES: ANG: ± = .5° FRACT. ± = 1/32 DECIMALS: .XX ± = .01 .XXX ± = .005	
REVISION : E	SHEET: 3 OF 3